	Current XRef	Retrieval Classif
1	257/E23.088; 257/E23.09	361/803
2	257/208; 257/211; 257/723; 257/758; 257/773; 438/106; 438/107; 438/128; 438/618; 438/622	257/723
3	257/E23.088; 257/E23.09; 361/719; 361/720; 361/769; 361/770; 361/804; 439/108; 439/66; 439/74	361/803; 439/66
4	257/E23.088; 257/E23.09	361/761
5	257/E23.063; 257/E25.023; 29/830; 29/840; 29/841; 361/735; 361/746	361/735
6	361/760; 361/761; 361/764	361/761; 361/764

	Title	Current OR
7	Modularly expandable multi-layered semiconductor component	257/668
8	Fully hermetic semiconductor chip, including sealed edge sides	257/635
9	Micro-flex technology in semiconductor packages	257/784

	Current XRef	Retrieval Classif
7	257/207; 257/208; 257/691; 257/694; 257/698; 257/700; 257/701; 257/704; 257/706; 257/710; 257/712; 257/729; 257/758; 257/789; 257/794; 361/735; 361/744; 361/790	361/735; 361/744; 361/790
8	257/620; 257/644; 257/701; 257/702; 257/723; 257/758; 257/760; 257/784; 257/786; 257/788; 257/791; 257/792; 257/E23.133	257/723
9	257/686; 257/E23.034; 257/E23.036; 257/E23.069; 257/E25.013	257/686

	Title	Current OR
1	Method and apparatus for providing power to a microprocessor with intergrated thermal and EMI management	361/803
2	Process for assembling three-dimensional systems on a chip and structure thus obtained	716/1
3	Method and apparatus for providing power to a microprocessor with integrated thermal and EMI management	361/803
4	Method and apparatus for providing power to a microprocessor with integrated thermal and EMI management	361/761
5	Stackable microcircuit layer formed from a plastic encapsulated microcircuit and method of making the same	361/743
6	Flip-chip RF-ID tag	361/782

	Title	Current OR
10	Packaging for bare dice employing EMR-sensitive adhesives	257/680
11	Chip package mounting structure for controlling warp of electronic assemblies due to thermal expansion effects	361/760
12	Multi-chip module package with insulating tape having electrical leads and solder bumps	361/760

	Current XRef	Retrieval Classif
10	206/724; 257/678; 257/686; 257/704; 257/707; 257/749	257/686
11	174/260; 257/723; 257/724; 257/E23.077; 257/E23.106; 361/782; 361/783; 361/795	257/723
12	174/260; 257/723; 257/737; 257/777; 257/778; 257/E23.177; 257/E25.011; 257/E25.013; 361/776; 361/783; 361/790; 361/803	257/723; 257/777; 257/E25.011; 361/790; 361/803

	Title	Current OR
13	Chip-on-board printed circuit assembly using aluminum wire bonded to copper pads	361/760
14	Stackable modules and multimodular assemblies	361/735

	Current XRef	Retrieval Classif
13	174/251; 174/259; 174/260; 174/52.2; 174/52.3; 228/123.1; 257/723; 257/724; 257/784; 257/786; 257/787; 257/788; 257/793; 257/E23.025; 257/E23.072; 257/E23.125; 361/771; 361/772; 361/777; 361/779; 361/783	257/723
14	257/685; 257/686; 257/723; 257/777; 257/E25.011; 361/733; 361/744; 361/761; 361/764; 361/790; 361/803; 439/66; 439/91	257/685; 257/686; 257/723; 257/777; 257/E25.011; 361/733; 361/735; 361/744; 361/761; 361/764; 361/790; 361/803; 439/66; 439/91

	Title	Current OR
15	Pad array semiconductor device with thermal conductor and process for making the same	361/707
16	High density multichip package with interconnect structure and heatsink	257/713
17	Connector system for coupling to an integrated circuit chip	361/783
18	Compressive pedestal for microminiature connections	430/314
19	MICROELECTRONIC INTERCONNECTION SUBSTRATE	428/601

	Current XRef	Retrieval Classif
15	165/185; 165/80.3; 174/16.3; 257/700; 257/712; 257/E23.101; 257/E23.105; 361/761; 361/764	361/761; 361/764
16	257/724; 257/E23.104; 257/E23.169; 257/E25.011	257/E25.011
17	257/E21.511; 257/E23.078; 361/764; 361/776	361/764
18	257/E21.511; 257/E23.078; 361/760; 361/771; 430/315; 430/317; 430/329; 439/66; 439/74	439/66
19	257/723; 257/750; 257/E23.072; 257/E25.029; 428/621; 428/626; 428/656; 428/686; 428/935	257/723

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TITLE: **Stackable microcircuit** layer formed from a plastic encapsulated **microcircuit** and method of making the same

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US-CL-CURRENT: 361/743, 257/E23.063 , 257/E25.023 , 29/830 , 29/840 , 29/841 , 361/735 , 361/746

CLAIMS:

What is claimed is:

1. A method of making a **stackable microcircuit** layer comprising the steps of:
providing a plastic encapsulated **microcircuit** (PEM) that includes (a) a **microcircuit** having an active surface containing integrated circuitry and a bond pad, and (b) an encapsulant in contact with the **microcircuit**; and
modifying the PEM to produce a modified PEM having a modified surface on which modified surface is exposed a conductive member that is electrically connected to the bond pad.

2. The method of claim 1 further comprising the step of forming an electrical

lead on the modified surface of the modified PEM that leads from the conductive
member to an edge of the modified PEM

3. The method of claim 1 wherein the **microcircuit** is a pre-tested
microcircuit.

4. The method of claim 1 wherein the **microcircuit** is a burned-in **microcircuit**.

5. The method of claim 2 wherein the modifying step is accomplished through
grinding.

6. The method of claim 2 comprising the further step of covering the
electrical lead with an insulating layer.

7. The method of claim 1 comprising the further step of reducing the thickness
of the modified PEM by thinning a backside of the modified PEM that is opposite
to the electrical lead.

8. The method of claim 7 wherein the step of reducing the thickness of the
modified PEM by thinning a back side of the modified PEM is accomplished
through grinding.

9. The method of claim 1 comprising the further step of reducing the area of
the modified PEM.

10. The method of claim 9 wherein the further step reducing the area of the
modified PEM is accomplished by sawing the modified PEM along one or more
edges.

11. The method of claim 1 wherein the conductive member that electrically
connects to the bond pad is part of a wire bond.

12. The method of claim 11 wherein the conductive member is a gold ball bond.

13. The method of claim 11 wherein the conductive member is a wire.

14. The method of claim 11 wherein the conductive member is a wedge bond.

15. The method ofclaim 11 wherein the conductive member is a lead frame.

16. The method of claim 1 wherein the conductive member that electrically connects to the bond pad is a conductive trace on a flexible substrate.

17. The method of claim 16 wherein the conductive trace is a flexible lead beam and the flexible substrate is a polyimide film.

18. The method of claim 1 wherein the PEM's encapsulant is a plastic body that at least partially encapsulates the **microcircuit**.

19. The method of claim 18 wherein the conductive member that is electrically connected to the bond pad is encapsulated in the plastic body of the PEM and wherein the modifying step comprises thinning a first side of the PEM to expose the conductive member.

20. The method of claim 19 wherein the PEM comprises a thin small outline package (TSOP) containing a gold ball bond, a lead frame, and a wire that are collectively encapsulated in the plastic body of the PEM, wherein the gold ball bond is formed on the bond pad, wherein the wire connects the gold ball bond to the lead frame, and wherein the gold ball bond is the conductive member exposed on the modified surface of the modified PEM through thinning.

21. The method of claim 20 wherein the thinning removes the lead frame and the wire along with a portion of the plastic body.

22. The method of claim 18 wherein the PEM comprises a

uBGA package that includes a polyimide film and a flexible lead beam that are collectively encapsulated in the plastic body, wherein one end of the flexible lead beam is connected to the bond pad, and wherein a solder ball is deposited onto an exterior side of the polyimide film in contact with an opposite second end of the flexible lead beam.

23. The method of claim 22 wherein the modifying step comprises removing at least a portion of the solder ball.

24. The method of claim 23 wherein the removing of at least a portion of the solder ball is accomplished by heating the solder ball to form molten solder and wicking away the molten solder.

25. The method of claim 24 wherein the he removing of at least a portion of the solder ball is accomplished by shearing.

26. A method of making a **stackable microcircuit** layer comprising the steps of: providing a plastic encapsulated **microcircuit** (PEM) that includes: (a) a **microcircuit** having a bond pad, (b) a conductive lead assembly connected to the bond pad, and (c) a plastic body encapsulating the **microcircuit,** the bond pad, and at least part of the conductive lead assembly; and grinding a top surface of the PEM to remove a top portion of the plastic body along with at least part of the conductive lead assembly to leave a planar section that contains the **microcircuit** and the bond pad.

27. The method of claim 26 further comprising the step of forming an electrical lead on top of the planar section which leads from the bond pad of the **microcircuit** to at least one edge of the planar section.

28. The method of claim 26 wherein the grinding step also leaves a vestigial part of the conductive lead assembly in the planar section.

29. The method of claim 26 wherein the vestigial part of the conductive lead assembly is a part of a wire bond.

30. A method of making a **stackable microcircuit** layer comprising the steps of: providing a plastic encapsulated **microcircuit** (PEM) that includes (a) a **microcircuit** having an active surface containing integrated circuitry and a bond pad, (b) a wire bond connected to the bond pad, a lead frame, and a wire that connects the wire bond to the lead frame, and (d) a plastic body that encapsulates the known-good **microcircuit,** the wire bond, the wire, and at least a portion of the lead frame; grinding a surface of the PEM to remove the lead frame and the wire and form a modified PEM that contains the **microcircuit,** the bond pad, and the wire bond, the modified PEM having a modified surface on which modified surface is exposed the wire bond that is connected to the bond pad; and forming an electrical lead on the modified surface that leads from the wire bond to an edge of the modified PEM.

31. The method of claim 30 wherein the PEM has a package form factor known as a thin small outline package (TSOP).

32. The method of claim 30 comprising the further step of covering the electrical lead with an insulating layer.

33. The method of claim 30 comprising the further step of reducing the thickness of the modified PEM by thinning a backside of the modified PEM that is opposite to the electrical lead.

34. The method of claim 30 comprising the further step of reducing the area of

the modified PEM.

35. The method of claim 34 wherein the further step reducing the area of the modified PEM is accomplished by sawing the modified PEM along one or more edges.

36. A **stackable microcircuit** layer comprising: (1) a modified section of a plastic encapsulated **microcircuit** (PEM) that originally contained (a) a known-good **microcircuit** having a bond pad, (b) a conductive lead assembly connected to the bond pad, and (c) a plastic body encapsulating the known-good **microcircuit,** the bond pad, and the conductive lead assembly, the modified section formed by removing a portion of the conductive lead assembly from the PEM; the modified section having a modified surface, the modified section containing the known-good **microcircuit,** the bond pad, and a remaining portion of the conductive lead assembly with an end thereof exposed on the modified surface; and (2) a reroute lead on the modified surface of the modified section to connect the exposed portion of the remaining portion of conductive lead assembly with an edge of the modified section.

37. The **stackable microcircuit** layer of claim 36wherein the commercially packaged **microcircuit** assembly has a package form factor known as a thin small outline package (TSOP).

38. The **stackable microcircuit** layer of claim 37 wherein the modified section is a planar section containing the known-good **microcircuit,** the bond pad, the remaining portion of the conductive lead assembly, and a reduced-height portion of the plastic body.

39. The **stackable microcircuit** layer of claim 38 wherein

the conductive lead
assembly originally comprises a wire bond, a lead frame, and a wire that are
collectively encapsulated in the plastic body of the PEM, wherein the wire bond
is formed on the bond pad, and wherein the wire connects the wire bond to the
lead frame.

40. The **stackable microcircuit** layer of claim 39 wherein the remaining portion
of the conductive lead assembly that is exposed on the modified surface is the
wire bond.

41. The **stackable microcircuit** layer of claim 40 wherein the wire bond is
exposed on the modified surface by grinding away a portion of the plastic body
along with the lead frame, the wire, and a portion of the wire bond.

42. The **stackable microcircuit** layer of claim 36 wherein the commercially
packaged **microcircuit** assembly has a package form factor known as a micro-Ball
Grid Array (uBGA) package.

43. The **stackable microcircuit** layer of claim 42 wherein the modified section
contains the known-good **microcircuit,** the bond pad, the remaining portion of
the conductive lead assembly, and the plastic body.

44. The **stackable microcircuit** layer of claim 43 wherein the conductive lead
assembly originally comprises a conductive trace, a flexible substrate that
supports the conductive trace, and a solder ball, a first end of the conductive
trace connected to the bond pad and a second end of the conductive trace
connected to the solder ball.

45. The **stackable microcircuit** layer of claim 44 wherein the remaining portion
of the conductive lead assembly that is exposed on the modified surface is the

second end of the conductive trace.